

FOR CONTRACT NO.: 02-3C9201

INFORMATION HANDOUT

PERMITS

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
NOTIFICATION NO. 1600-2011-0217-R1

BRIDGE INFORMATION *(NOT A PART OF THE CONTRACT)*

FINAL FOUNDATION REPORT

FINAL HYDRAULIC REPORT

FOUNDATION REVIEW

ROUTE: 02-SIS -5-R50.6/R52.1

**CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION**

To: Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, California 95814

Date: February 21, 2012

From: California Department of Fish and Game
Northern Region
601 Locust Street
Redding, California 96001

Project Title: Issuance of Streambed Alteration Agreement No. 1600-2011-0217-R1,
Yreka Shasta River Bridges Rehabilitation Project.

Project Location (Specific): Shasta River, approximately 0.85 mile upstream from the
confluence with Yreka Creek, Latitude 41.767387° North, Longitude 122.585743° West.

Project Location (City and County): Work will take place at the Interstate 5 Bridges
over the Shasta River, north of the City of Yreka, Siskiyou County.

Description of Project: See Attached Agreement.

Name of Public Agency Approving Project: California Department of Fish and Game.

Name of Agency Carrying Out Project: California Department of Transportation.

Exempt Status (Class and Guidelines Section): **Categorical Exemption: Class 2,
Section 15302** – Replacement or reconstruction of existing structures and facilities
where the new structure will be located on the same site as the structure replaced and
will have substantially the same purpose and capacity as the structure replaced.

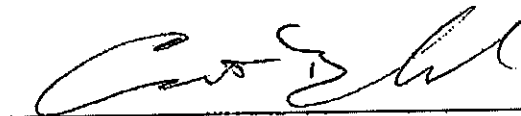
Reasons Why Project Is Exempt: The project proposes to rehabilitate the existing
northbound (Bridge No. 02-0148R) and southbound (Bridge No. 02-0148L) structures at
the Interstate 5 crossing of the Shasta River. No work will occur below the ordinary high
water mark and there will be no removal of healthy, mature, scenic trees as a result of
this project. The project will have no significant effect on the environment.

Lead Agency Contact Person: Craig Martz

Phone: (530) 225-2281

Signature:

Title:



Habitat Conservation Program Manager

Date:

2/23/12

☒ **Signed by Lead Agency**

☐ **Signed by Applicant**

Date received for filing at OPR:

**CALIFORNIA DEPARTMENT OF FISH AND GAME
NORTHERN REGION
601 LOCUST STREET
REDDING, CA 96001**



**STREAMBED ALTERATION AGREEMENT
NOTIFICATION No. 1600-2011-0217-R1
Shasta River**

**CALIFORNIA DEPARTMENT OF TRANSPORTATION
YREKA SHASTA RIVER BRIDGES REHABILITATION PROJECT**

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and the California Department of Transportation (Permittee) as represented by Mr. Derek Willis.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified DFG on August 24, 2011 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, DFG has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located at the Interstate 5 crossing of the Shasta River, tributary to the Klamath River, in the County of Siskiyou, State of California; Latitude 41.767387° North, Longitude 122.585743° West.

PROJECT DESCRIPTION

The project is limited to the rehabilitation of the northbound (Bridge No. 02-0148R) and southbound (Bridge No. 02-0148L) structures at the Interstate 5 crossing of the Shasta River (Post Mile 51.1), located north of the City of Yreka in Siskiyou County.

Specific construction activities include:

- Removing and replacing the existing bridge decks, bridge railings, joint seal assemblies, approach slabs, and placement of a temporary containment system to prevent materials from entering the Shasta River,
- Constructing new barrier rail on each bridge structure and installing new metal beam guard rail at the bridge approaches and departures,
- Excavating and enlarging all four existing pier footings to improve seismic safety,
- Constructing temporary falsework to support existing bridge girders and pier caps,
- Placing polyester overlays on the bridge approaches and decks,
- Constructing temporary access roads, including the potential placement of a temporary stream crossing, and
- Establishing equipment and material staging areas.

Access to the existing pier footings will be from current ranch roads beneath the structures; however, it is likely that new temporary access roads will need to be constructed from the southbound lanes of I-5 on each side of the Shasta River.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: Southern Oregon-Northern California Coast coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), western pond turtle (*Emys marmorata*), cliff swallows (*Hirundo pyrrhonata*), American kestrel (*Falco sparverius*), bats, and other aquatic and riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include: direct mortality of nesting birds through vegetation removal and construction disturbance, mortality of pond turtles as a result of vehicles and construction equipment, as well as injury to fish and benthic invertebrates through sediment transport and deposition, chemical pollution, and/or physical disturbance of the stream channel and adjacent riparian habitat

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1 Administrative Measures

Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to DFG personnel, or personnel from another state, federal, or local agency upon request.

- 1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.
- 1.3 Notification of Conflicting Provisions. Permittee shall notify DFG if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, DFG shall contact Permittee to resolve any conflict.
- 1.4 Project Site Entry. Permittee agrees that DFG personnel may enter the project site at any time to verify compliance with the Agreement.

2 Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

PROJECT TIMING

- 2.1 All work involving heavy equipment within the floodplain or on the stream banks shall be confined to the period commencing April 15 and ending November 30, of any year in which this Agreement is valid. If weather conditions permit, Permittee may perform work within the floodplain or on the banks after November 30, provided a written request is made to the Department at least 5 days before the proposed work period variance. Written approval from the Department for the proposed work period variance must be received by the Permittee prior to the start or continuation of work after November 30.
- 2.2 If work is performed within the floodplain or on the banks after November 30, the Permittee shall do all of the following:
 - a. Stage erosion and sediment control materials at the work site.
 - b. Monitor the seventy-two (72) hour forecast from the National Weather Service.
 - c. When the 72-hour forecast indicates a probability of precipitation of 60% or greater, or at the onset of any precipitation, ground disturbing activities shall cease and erosion control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetland or riparian areas.

HABITAT AND SPECIES PROTECTION

- 2.3 This Agreement does not authorize the take of any State threatened or endangered species. If the project could result in the "take" of a state listed threatened or endangered species, the Permittee has the responsibility to obtain from the Department, a California Endangered Species Act Permit (CESA 2081 Permit). The Department may formulate a management plan that will avoid or mitigate take. If appropriate, contact the Department CESA coordinator at (530) 225-2300.
- 2.4 Prior to initiating vegetation- or ground-disturbing Project activities, Permittee shall clearly delineate the limits of the work area. Permittee shall restrict all Project activities to the designated work area and shall maintain all fencing, stakes and flags until the completion of Project activities.
- 2.5 The stream banks and riparian zone of the Shasta River within the Project limits shall be protected as Environmentally Sensitive Areas (ESAs) and shall be off limits to construction equipment. Limited access by construction personnel may be needed for trimming riparian vegetation.
- 2.6 ESA fencing shall be installed as the first order of work. The placement of ESA fencing shall be inspected and approved by DFG prior to the initiation of work. Permittee shall provide written notification for inspection a minimum of 5 working days prior to beginning work. If DFG is unable to conduct a site inspection during this period, the inspection may be conducted by the Environmental Construction Liaison and the results forwarded to DFG for approval.
- 2.7 ESA fencing shall consist of temporary orange construction fence or other highly visible material that clearly delineates the limits of the work area. Environmentally Sensitive Areas shall be clearly shown on the Project plans and drawings. The Permittee shall ensure that the contractor, subcontractors, and all personnel working on the Project are instructed on the purpose of the ESA fencing and understand the limits of the work area.
- 2.8 Removal of existing vegetation shall not exceed the minimum necessary to complete operations. Impacts to riparian vegetation adjacent to existing bents on the south side of the river and at the temporary crossing site shall not exceed 0.18 acre. Whenever possible, riparian trees or shrubs shall be trimmed or topped to provide construction access, leaving root systems intact. No permanent impacts to riparian vegetation on the banks of the Shasta River are authorized by this Agreement.
- 2.9 Removal/trimming of woody riparian vegetation (trees and Himalaya berry) shall take place between September 1 and March 15 to avoid impacts to nesting birds.

- 2.10 To avoid impacts to nesting migratory birds, bridge deck removal shall take place between September 1 and March 15, or exclusionary devices shall be placed over existing weep holes prior to March 15 during the year that section of bridge deck is scheduled for removal.
- 2.11 To avoid impacts to nesting swallows, Permittee shall implement one of the following strategies:
- Removal of bridge decks shall take place between September 1 and March 15.
 - Existing swallow nests shall be removed prior to March 15 and swallows will be prevented from nesting on the bridges between March 15 and September 1.
 - Existing swallow nests shall be removed prior to March 15 and new nest materials shall be removed at regular intervals to prevent nest completion.
- 2.12 In no case shall completed nests with eggs or young be removed from the existing structures.
- 2.13 All percussive pile driving within 50 feet of the wetted channel of the Shasta River shall be confined to the period June 15 through September 30. Percussive pile driving greater than 50 feet from the wetted channel shall occur during the period June 1 through November 1.
- 2.14 Permittee shall conduct pre-construction surveys for western pond turtles. Any animals found within the limits of the work area shall be relocated to suitable locations approved by DFG.

PETROLEUM, CHEMICAL AND OTHER POLLUTANTS

- 2.15 All construction-related materials and equipment shall be stored in designated staging areas located within previously disturbed sites. If staging areas are designated within the floodplain, equipment and materials shall be removed prior to the onset of high flows and no later than November 30.
- 2.16 Refueling and vehicle maintenance shall be performed at least 100 feet from streams or other water bodies unless approved in writing by DFG.
- 2.17 No equipment or machinery shall be operated within any flowing stream.
- 2.18 Stationary equipment such as motors, pumps, generators, and welders that contain deleterious materials, located adjacent to the stream channel shall be positioned over drip pans.
- 2.19 If groundwater is encountered during excavation, the work area shall be dewatered by pumping groundwater to a portable tank, truck, or an upland

- containment area where it will not return to the Shasta River or other surface watercourse.
- 2.20 Water that has been in contact with uncured concrete shall be contained in a concrete washout facility, Baker tank, or other impervious container and shall not be discharged to surface or ground waters.
- 2.21 Permittee shall provide adequate containment to prevent bridge deck materials and/or debris, including concrete dust, paint flakes, abrasive materials used in cleaning/sand blasting or other pollutants from entering the Shasta River or its floodplain.
- 2.22 All construction activities performed in or near a stream shall have absorbent materials designated for spill containment and clean up activities on-site for use in an accidental spill. In the event of a discharge, the Permittee shall immediately notify the California Emergency Management Agency at 1-800-852-7550 and immediately initiate clean up activities. DFG shall be notified by the Permittee and consulted regarding clean-up procedures
- 2.23 No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

EROSION AND SEDIMENT CONTROL

- 2.24 The project shall at all time feature adequate erosion and sediment control devices to prevent the degradation of water quality.
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- 2.25 Soils exposed by project operations shall be treated to prevent sediment runoff and transport. Erosion control measures shall include the proper installation and maintenance of approved Best Management Practices (BMPs) and may include applications of seed, certified weed-free straw, compost, fiber, commercial fertilizer, stabilizing emulsion and mulch, or combinations thereof.
- 2.26 Soils adjacent to the stream channel that are exposed by project operations shall be adequately stabilized when rainfall is reasonably expected during construction, and immediately upon completion of construction, to prevent the mobilization of such sediment into the stream channel or adjacent riparian areas. National Weather Service forecasts shall be monitored by the Permittee to determine the chance of precipitation.

- 2.27 Following construction, all disturbed upland areas shall be stabilized and reseeded with a native seed mix consisting of common yarrow (*Achillea millefolium*), California brome (*Bromus carinatus*), squirrel tail (*Elymus elymoides*), barley (*Hordeum vulgare*), and antelope bitterbrush (*Purshia tridentata*).
- 2.28 Following construction, all disturbed riparian vegetation and areas devoid of riparian vegetation along the Shasta River shall be revegetated with white alders and narrow-leaved willow cuttings. Replanted areas shall be over planted at a minimum 3:1 ratio and monitored for three years to achieve at least a 65% survival rate.

WATER DRAFTING AND TEMPORARY STRUCTURES

- 2.29 No water shall be drafted from the Shasta River or coho salmon critical habitat for Project activities. If water is drafted from a stream channel that is not critical habitat for coho salmon, water drafting shall take place from June 1 through November 1 and shall conform to the NOAA Fisheries *Water Drafting Specifications* dated August 2001.
- 2.30 No work shall occur within the wetted channel or below the ordinary high water mark of the Shasta River. If necessary, a temporary equipment crossing may be located at an existing cattle watering lane just east of the northbound I-5 bridge structure. Abutments for the temporary, clear span bridge shall be located upslope from the ESA fence on both sides of the river.
- 2.31 Material placed for temporary bridge abutments shall consist of clean, pre-washed, uncrushed natural river rock. Gravel must be washed at least once and have a cleanliness value of 85 or higher (California Test No. 227). Particle size shall be graded with 95-100% passing a 4- or 5-inch screen, 75-85% passing a 2-inch screen, 40-50% passing a 1-inch screen, 25-35% passing a ¾-inch screen, 10-20% passing a ½-inch screen, and 0-5% passing a ¼-inch screen (% by dry weight) or approved by DFG. Gravel must be completely free of oils or any other petroleum based material, clay, debris, and other types of organic matter. Gravel may be stockpiled on site, but mixing with any earthen material is prohibited.
- 2.32 Structures and associated materials not designed to withstand high seasonal flows shall be removed from the floodplain prior to November 30.
- 2.33 RSP and energy dissipation materials shall consist of clean rock, competent for the application, sized and properly installed to resist washout. RSP slopes shall be supported with competent boulders keyed into a footing trench with a depth sufficient to properly seat the footing course boulders and prevent instability (typically at least 1/3 diameter of footing course boulders). Excavation spoils shall not be side-cast into the channel nor is any manipulation of the substrate of the channel authorized except as herein expressly provided.

CONTACT INFORMATION

Any communication that Permittee or DFG submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or DFG specifies by written notice to the other.

To Permittee:

Mr. Derek Willis
Department of Transportation
Post Office Box 496073
Redding, CA 96049-6073
Fax: (530) 225-3495
Email: derek_willis@dot.ca.gov

To DFG:

Department of Fish and Game
Northern Region
601 Locust Street
Redding, CA 96001
Attn: Lake and Streambed Alteration Program – Craig Martz
Notification #1600-2011-0217-R1
Fax: (530) 225-2267
Email: cmartz@dfg.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute DFG's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

DFG may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before DFG suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before DFG suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects DFG's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

DFG may amend the Agreement at any time during its term if DFG determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the

corresponding amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter DFG approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on December 31, 2015, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a) (2) requires.

EXHIBITS

The document listed below is included as an exhibit to the Agreement and incorporated herein by reference.

- A. Exhibit 1. *Natural Environment Study for the Yreka Shasta River Bridges Rehabilitation Project*. Caltrans. June 28, 2011.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

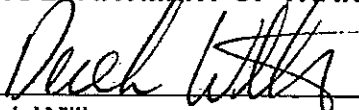
AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify DFG in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR DEPARTMENT OF TRANSPORTATION

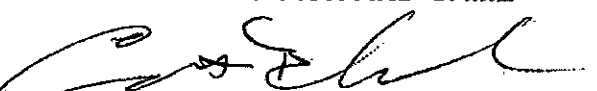


Derek Willis

2/14/12
Date

Project Manager

FOR DEPARTMENT OF FISH AND GAME



Curt Babcock

Habitat Conservation Program Manager

2/23/12
Date

Prepared by: Craig Martz, Staff Environmental Scientist

Memorandum

*Flex your power!
Be energy efficient!*

To: MR. JOSEPH E. DOWNING
Branch Chief
Bridge Design Branch 3
Office of Bridge Design North

Date: July 19, 2011

File: 02-Sis-5-PM 51.4
EA 02-3C9201
Project ID.: 0200000345
Shasta River Bridge
(Earthquake Retrofit)
Br. No. 02-0148R/L

Attention: Mr. Ashraf Ahmed

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES - MS 5

Subject: Foundation Report for Shasta River Bridge (Br. No. 02-0148R/L)

INTRODUCTION/SCOPE OF WORK

Per your request, the Office of Geotechnical Design-North (OGD-N) has prepared this report for the Shasta River Bridge (Bridge No. 02-0148R/L) earthquake retrofit. This report is based on review and evaluation of the existing bridge files.

This Foundation Report supersedes the Structure Preliminary Geotechnical Report for Advanced Planning Study for Shasta River Bridge (Br. No. 02-0148R/L) dated April 06, 2010.

PROJECT DESCRIPTION

The existing 3-span bridges were built in 1970. They are approximately 532 feet long and 41 feet wide. Both bridges are cast-in-place cantilevered box girder bridges.

The proposed earthquake retrofit is to enlarge the existing Bent 2 and Bent 3 spread footings. The vertical datum used in this report is NAVD 88. An additional 2.84 feet needs to be added to the NGVD 29 vertical datum elevations to convert these elevations to vertical datum NAVD 88.

FIELD INVESTIGATION

Eleven 2.5-inch diameter mud rotary borings were drilled to a maximum depth of approximately 55 feet in 1966 and 1967. Eight 2.5-inch diameter cone penetrometer tests were penetrated to a maximum depth of 18 feet in 1966 and 1967. No new borings were conducted for this report.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

According to As Built Log of Test Borings (LOTBs) dated May 9, 1973, the materials encountered consist of dense to very dense sand, gravel, cobbles, and boulders with silt and clay binder. These soils were mostly encountered in the borings located in the river bank. Medium dense gravel and sand were encountered in the borings located closer to the river channel. Weathered and fractured "graphite schist" was encountered in all mud rotary borings at varied depths. The hardness of the graphite schist was not mentioned in the "As Built" LOTBs. The depth to the top of the "graphite schist" was six feet or less in the river channel. The top of the "graphite schist" on the river bank was up to 49 feet deep. Based on the "As Built" Foundation Plan (circa 1970?), approximately 50 feet and 73 feet of fill materials were placed under the Abutment 1 and Abutment 4 areas respectively. The condition and properties of the fill materials are unknown at this time.

Groundwater depth was not shown in the "As Built" LOTBs. In this report, we assume groundwater depth is correlated with water in the channel and that the river water elevation reflects the groundwater depth.

SCOUR EVALUATION

The "Final Hydraulic Report for the Shasta River Bridge" dated July 12, 2011 by the Hydraulic Engineering Branch states that "there was no significant migration, no hydraulic skew, no contraction, debris, degradation or mining affecting the bridge. In low flows the piers are out of the water and during high flows the water is so shallow that no major scour is expected." The report also states that "Bridge foundations (are) determined to be stable for calculated scour conditions; scour above top of footings."

Mr. Joseph Downing
July 19, 2011
Page 3

Shasta River Bridge
Bridge No. 02-0148R/L
Project ID.: 02000000345
EA 02-3C9201

CORROSION EVALUATION

The geotechnical design for the earthquake retrofit is based on the "As-Built" LOTBs, therefore, no information on corrosivity is available. Based on the geology of the site, we consider the foundation materials at the site to be non-corrosive. But due to the bridge location and elevation (approximately 2500 feet), deicing salts are likely used on the roadway and bridge deck, therefore, appropriate corrosion measures may be considered.

SEISMIC RECOMMENDATIONS

Based on the Caltrans 2009 Seismic Design Procedure, the nearest active fault to the site is the Cedar Mountain fault system (Ike's Mountain Section) (Fault ID No. 45) with M_{max} of 7.3. The fault is located northeast of the bridge site, and the rupture distance to the fault plane from the bridge site is estimated to be 23 miles.

Based on the As-Built Log of Test Borings, a shear wave velocity (V_{s30}) of 1870 feet per second was estimated for the top 100 feet of subsurface materials.

Using the above shear wave velocity, the ground motion generated from the nearest active fault is less than the probabilistic and the statewide minimum requirements; and since neither probabilistic nor the statewide minimum requirement governed the entire range of the spectral acceleration, the attached design Acceleration Response Spectrum (ARS) Curve is an envelope of the two methods. The probabilistic method is based on the USGS 5% probability of exceedance in 50 years with a return period of 975 years. The peak ground acceleration as shown on the ARS curve is about 0.23g. Please note the probabilistic spectral acceleration were obtained at the USGS web site at <https://geohazards.usgs.gov/deaggint/2008/>.

Liquefaction Potential

The liquefaction analysis indicates minimal potential for liquefaction during an earthquake event.

Surface Fault Rupture Hazard

There are no known active faults crossing beneath or extending directly toward the site. Therefore, the potential hazard due to ground rupture is considered to be very low.

AS-BUILT FOUNDATION DATA

According to the "As Built" Foundation Plan, the existing bridge foundations are supported by spread footings at all support locations. Apparently, the Abutment 1 and Abutment 4 footings were founded on compacted fills and all footings at the bents were founded on schist bedrock. The "As Built" Foundation Plan indicates that approximately 50 feet and 73 feet of fill material were placed under the Abutment 1 and the Abutment 4 footings respectively. Table 1 shows "As-Built" spread footing data for both left and right bridges.

Table 1 "As-Built" Spread Footing Data

Support Location	Minimum Footing Width (feet)	Bottom of Footing Elevation (feet)		Recommended Bearing Limits	
		Maximum	Minimum	Allowable Footing Pressure	Design Footing Pressure
Abut 1 (left)	9.5	2489.4	-----	2 tsf (4ksf)	2 tsf (4ksf)
Bent 2 (left)	16	2382	----	8 tsf (16ksf)	6 tsf (12ksf)
Bent 3 (left)	16	2388	----	8 tsf (16ksf)	6 tsf (12ksf)
Abut 4 (left)	9.5	2485.3	2485.9	2 tsf (4ksf)	2 tsf (4ksf)
Abut 1 (right)	9.5	2489.8	2490.4	2 tsf (4ksf)	2 tsf (4ksf)
Bent 2 (right)	16	2393.6	2391.5	8 tsf (16ksf)	6 tsf (12ksf)
Bent 3 (right)	16	2385	----	8 tsf (16ksf)	6 tsf (12ksf)
Abut 4 (right)	9.5	2485.3	2485.9	2 tsf (4ksf)	2 tsf (4ksf)

Note: The elevations presented in this table are based on the As-Built Plans.

We assume the allowable footing pressure indicated in "As Built" Foundation Plan was gross allowable bearing capacity. We also assume that the uplift resistance provided by the spread footings is insignificant.

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Bridge No. 02-0148R/L
Project ID.: 02000000345
EA 02-3C9201

FOUNDATION RECOMMENDATIONS

The proposed earthquake retrofit is to enlarge the existing Bent 2 and Bent 3 spread footings dimensions from 16' x 28' to 22' x 34' (width B x length L). The footings will be enlarged three (3) feet evenly on all sides. The bottom of the spread footing elevations will be on the same elevation as the existing Bent 2 and Bent 3 spread footings. Based on the information available, we recommend a nominal bearing pressure of 36 ksf for the Bent 2 and Bent 3 spread footings retrofit. The new portion of the footings must be founded on clean bedrock. This project is designed using Load Factor Design (LFD) methodology.

Table 2. Foundation Design Recommendations for Spread Footings, Bridge No. 02-0148R/L

Support Location	Minimum Footing Width (feet)	Bottom of Footing Elevation (feet)	Recommended Bearing Limits	
			WSD ⁽¹⁾	LFD ⁽²⁾
			Gross Allowable Bearing Capacity (q_{all}) ksf	Nominal Bearing Resistance (q_n) ksf
Bent 2 (Right)	22.0	+ 2394.34 ±	N/A	36
Bent 3 (Right)	22.0	+ 2387.84±	N/A	36
Bent 2 (Left)	22.0	+ 2384.84±	N/A	36
Bent 3 (Left)	22.0	+ 2390.84±	N/A	36

- Notes:
1. Working Stress Design (WSD): The Maximum Contact Pressure (q_{max}) is not to exceed the Recommended Gross Allowable Soil Bearing Capacity, (q_{all}).
 2. Load Factor Design (LFD): The Maximum Contact Pressure (q_{max}), divided by the Strength Reduction Factor (ϕ) is not to exceed the Nominal Bearing Resistance (q_n).

CONSTRUCTION CONSIDERATIONS

1. Ground water and seepage may be encountered during the footing excavations. The amount of water and flow rate of water will depend on seasonal precipitation and other factors.
2. Footing excavations may encounter very hard bedrock and require specialized equipment and/or specialized methods.

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Bridge No. 02-0148R/L
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3. All footing excavations are to be inspected and approved by this Office or a representative of the Office of Structure Construction when the excavations are completed to the bottom of footing and prior to placement of concrete.
4. Spread footings shall be placed neat against competent materials. All loose materials shall be removed prior to placement of concrete. Deeper removal may be required if soft materials, and other non-suitable materials are encountered at the bottom of the excavation. Structural concrete may be used to level the subgrade of the spread footings.

PROJECT INFORMATION

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

- A. As-Built Log of Test Borings (Shasta River Bridge, Br. No. 02-0148R/L).

Data and information included in the Information Handout provided to the bidders and contractors are:

- A. Foundation Report for Shasta River Bridge (Br. No. 02-0148R/L) dated July 19, 2011.

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Shasta River Bridge
Bridge No. 02-0148R/L
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Data and information available for inspection at the District 2 Office:

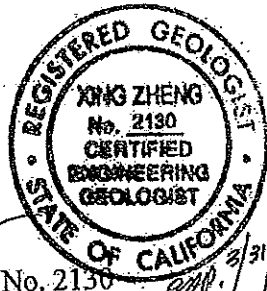
A. None

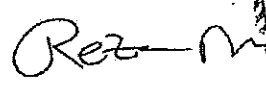
Data and information available for inspection at the Transportation Laboratory:

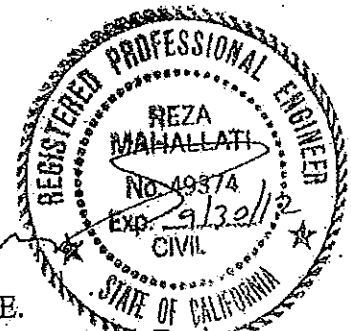
A. As-Built Plans for the Shasta River Bridge, Br. No. 02-0148R/L.

If you have any questions regarding this report, please contact Xing Zheng at 227-1036 or Reza Mahallati at 227-1033.


Xing Zheng, C.E.G. No. 2130
Engineering Geologist
Geotechnical Design – North




Reza Mahallati, P.E.
Senior Materials and Research Engineer
Geotechnical Design – North



c: ReidBuell
District Project Manager
R.E. Pending File
Eskinder Taddese-PCE (E-copy)
GS Corporate Mark William (E-copy)
Byron Berger-DME (E-copy)
GDN File
GS File Room

Shasta River Bridge

Bridge No. 02-0148 R/L

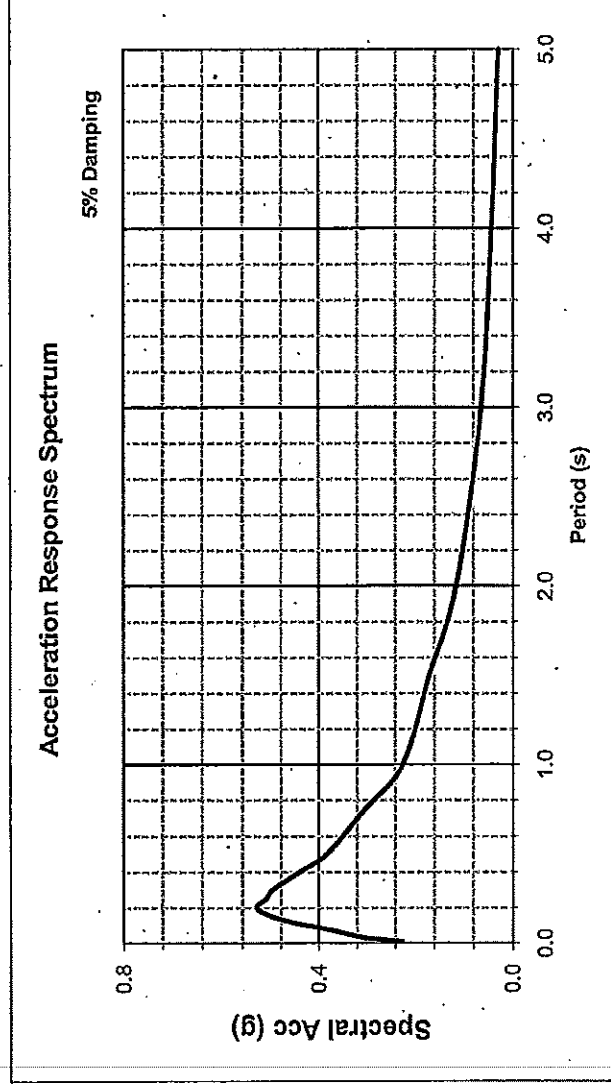
EFIS 0200000345

Latitude 41.7672

Longitude -122.5858

Control Envelope

Period (s)	Sa(g)
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0.020	0.262
0.030	0.299
0.050	0.336
0.075	0.373
0.100	0.425
0.120	0.460
0.150	0.498
0.200	0.531
0.250	0.510
0.300	0.497
0.400	0.440
0.500	0.383
0.750	0.304
1.000	0.225
1.500	0.170
2.000	0.115
3.000	0.065
4.000	0.044
5.000	0.030



Deterministic Procedure Data

Fault Cedar Mountain fault system (Ike's Mountain section)

Fault ID	45	R_{rup}	36	km
Style	N	R_{jb}	36	km
Mmax	7.3	R_x	22	km
Dip	60	V_{ss0}	570	m/s
Z_{for}	0	$Z_{1.0}$	N/A	m
		$Z_{2.5}$	N/A	km

Notes

Please note the Design ARS curve is an envelope of minimum and probabilistic spectrum.
The probabilistic method is based on the USGS 5% Probability of Exceedance in 50 years (975 years return period).

Final
Design Response Spectrum

Memorandum

To: Joe Downing
Office of Structure Design
Design Branch 3
Att: Ashraf Ahmed

Date: July 12, 2011

File: 02-SIS-005-PM R51.4
EA 02-3C920K
Shasta River Bridge
Br, No. 02-0148 L/R

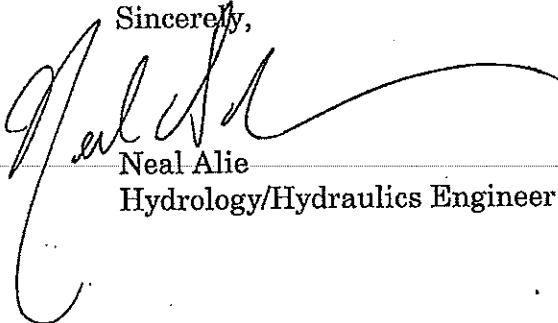
From: Department of Transportation
Hydraulic Engineering Branch

Subject: Final Hydraulic Report for the Shast River Bridge.

Attached for your records is the Final Hydraulic Report for the

Above referenced project. If you have any questions, please contact me
at 227-0442.

Sincerely,



Neal Alie
Hydrology/Hydraulics Engineer

cc: Steve Ng

DIVISION OF STRUCTURES Final Hydraulic Report

Shasta River Bridge

Located in Siskiyou County

JOB:

Bridge No. 02-0148 L/R

Bridge Retrofit

LOCATION:

02-SIS-005-PM R51.16

DATE:

July 12, 2011

WRITTEN BY:

Neal Alie

REVIEWED BY:

Steve Ng

General

The office of Structure Design is proposing to retrofit the footings of the Shasta River Bridge located on Interstate 5 in Siskiyou County. Enlarging the footing and providing tie-down anchors and top mat reinforcing will retrofit the existing footings.

The existing structure was built in 1970 and is a C.I.P. cantilevered (4) cell box girders with suspended precast, prestressed (5) "I" girder spans on RC single column bents and RC open end seat abutments all on spread footings. The existing bridge is 500 feet long and 36 feet wide with a structural depth of 7.3 feet.

This report makes extensive reference to the (1) As-Builts Plans (2) Bridge Maintenance Reports (3) General plans and profiles submitted by structures, (4) Bridge Department Preliminary Report, November 1955, (5) Division of Structures Preliminary Report, April 1992.

All elevations indicated in this report are referenced to the General Plans Submitted by Design.

Drainage Basin

Shasta River drains a watershed of approximately 690 sqmi at the project site. Shasta River rises southwest of the City of Weed in the Klamath Mountains at about elevation 9000 ft and flows northerly about 9 mi to elevation 3000, thence, about 28 mi to the site at elevation 2400 feet. Approximately 21 miles upstream from the site is the Dwinnell Dam, which was constructed in 1926 and has a storage capacity of 30000 acre ft. The average rainfall in this large basin varies from 5 to 45 inches with varying times of concentration due to the possibility of warm rain melting snow.

Discharge

A stream gage is located on Shasta River near Yreka and records data for a 793-sqmi basin. Several methods were used to determine the Design Flood, (Q-50) and the Base Flood, (Q-100) including statistical analysis, the National Flood Frequency method utilizing regional regression equations for the geographic area of the watershed and the "Chart A" stream discharge nomograph of the California Culvert Practice. **The 50-year discharge was calculated to be 11,000 cfs and the 100-year 13,000 cfs.** There was a flood of record in December 1964 with an estimated discharge of 19,000

cfs approximately one mile upstream.

Stage, Velocity and Required Waterway

The Hydraulic Program (BrEase) was used to perform a one-dimensional hydraulic analysis to calculate the water surface elevation and velocity at the bridge locations. The average velocity and the stage for the 50-year and 100-year discharges at the upstream face of the bridge are given below. The results are based on a roughness coefficient of 0.030 and a gradient of 0.0095.

	WSEL	Average Velocity	Available Freeboard
50-year Design	2407.1 ft	12.6 fps	81.9 ft
100-year Base Flood	2407.6 ft	13.2 fps	81.4 ft

There is more than adequate waterway area and freeboard for both the 50-year and 100-year discharges. The flood of record, (19,000 cfs) generated a water surface elevation of 2409.0 feet providing 80.0 feet of freeboard.

Streambed and Scour

The existing streambed is composed of silt and gravel. The over bank area is pasture with short grasses.

According to the Caltrans Maintenance Records there was a minor erosion problem in the early 1970's at the embankments due to deck drains. It appears this problem was rectified and was no longer mentioned in the subsequent inspections.

In 04/18/2001 Structure Hydraulics performed a field investigation and subsequent analysis and determined that there was no significant migration, no hydraulic skew, no contraction, debris, degradation or mining affecting the bridge. In low flows the piers are out of the water and during high flows the water is so shallow that no major scour is expected.

The Bridge's scour potential was assessed in accordance with FHWA Technical Advisory T5140.23, "Evaluating Scour at Bridges", and within current Caltrans guidelines. The bridge was determined to be not scour critical. The item 113 code is 8, "Bridge foundations determined to be stable for calculated scour conditions; scour above top of footings".

Shasta River Bridge
Br. No. 02-0148 L/R
02-SIS-5-PM R51.4
EA 02-3C920K

It is also assumed that the footings were placed on competent rock that resists scour.
The Geotechnical Branch should confirm this.

Drift

Structure Hydraulics does not have any concerns with drift.

Bank Protection

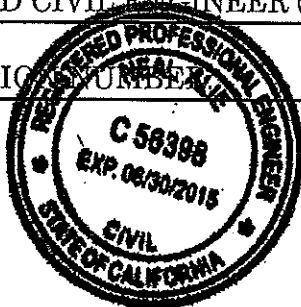
No Bank protection is needed.

HYDROLOGIC SUMMARY FOR SHASTA RIVER BRIDGE			
Drainage Area: 690 sqmi			
	Design Flood	Base Flood	Overtopping Flood/Flood of Record?
Frequency	50-yr	100-yr	N/A
Discharge	11,000 cfs	13,000 cfs	N/A
Water Surface Elevation at Bridge	2407.1 ft	2407.6 ft	N/A
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the professional Engineers Act of the State of California.

REGISTERED CIVIL ENGINEER (SIGNATURE)

REGISTRATION



C056398

DATE: 7/12/2011

FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES GEOTECHNICAL SERVICES

To: Structure Design

1. Design
2. R.E. Pending File
3. Specifications & Estimates
4. File

Geotechnical Services

1. GD - North ; South ; West
2. GS File Room

Date:

7/13/11

Shesta River Br.

Structure Name

02-515-005-51.4

District

County

Route

km-Post

m.

District

Project Development

District Project Engineer

2000-345

02-309201

02-0148 R/L

E.A. Number

Structure Number

Foundation Report By:

X. Zhang

Dated:

3/1/11

Reviewed By:

A. Ahmad

(SD)

R. Price

(GS)

General Plan Dated:

6/15/11

Foundation Plan Dated:

6/29/11

☒ No changes.

☐ The following changes are necessary.

FOUNDATION CHECKLIST

Pile Types and Design Loads

- ☒ Pile Lengths
- ☒ Pre-drilling
- ☒ Pile Load Test
- ☒ Substitution of H Piles For Concrete Piles
- ☐ Yes ☐ No

- ☒ Footing Elevations, Design Loads, and Locations
- ☒ Seismic Data
- ☒ Location of Adjacent Structures and Utilities
- ☒ Stability of Cuts or Fills
- ☒ Fill Time Delay

- ☒ Effect of Fills on Abutments and Bents
- ☒ Fill Surcharge
- ☒ Approach Paving Slabs
- ☒ Scour
- ☒ Ground Water
- ☒ Tremie Seals/Type D Excavation

Structure Design

Bridge Design Branch No.

Geotechnical Services

Rev. 08/02